

**Road Safety Audit  
Ossipee, New Hampshire  
NH 16 / Mount Shaw Road Intersection**



**Date RSA Conducted: September 27, 2016**  
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**Date strategies last updated:**



# Road Safety Audit Report

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## I. Executive Summary

Based on the Road Safety Audit conducted on September 27, 2016 at the intersection of NH 16 and Mount Shaw Road in the Town of Ossipee, the following safety mitigation strategies are recommended.

### Short Term Solutions

<b>NHDOT:</b>	1. District 3 will contact Windy Fields Farm about their signs and brush within the ROW that are blocking sight distance for their driveway.
<b>Town:</b>	2. The Police Department should provide enforcement along Route 16.

### Medium Term Solutions

<b>NHDOT:</b>	3. Bureau of Traffic will evaluate the signs along Route 16 especially those warning of the intersection.
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### Long Term Solutions

<b>NHDOT:</b>	4. Provide the two way left turn lane for Mount Shaw Road and include a 5' apron for Mount Shaw Road. Bureau of Traffic will evaluate the pavement markings and signs along Route 16. Any changes will be included the Ossipee State project #10431.
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## II. Road Safety Audit Process:

The intersection of New Hampshire Route 16 (NH 16) and Mount Shaw Road has been a safety concern for the Town of Ossipee. The objective of this study was to complete a road safety audit (RSA) of the intersection vicinity. The Study area includes the intersection of NH 16 and Mount Shaw Road as shown in Figure 1.

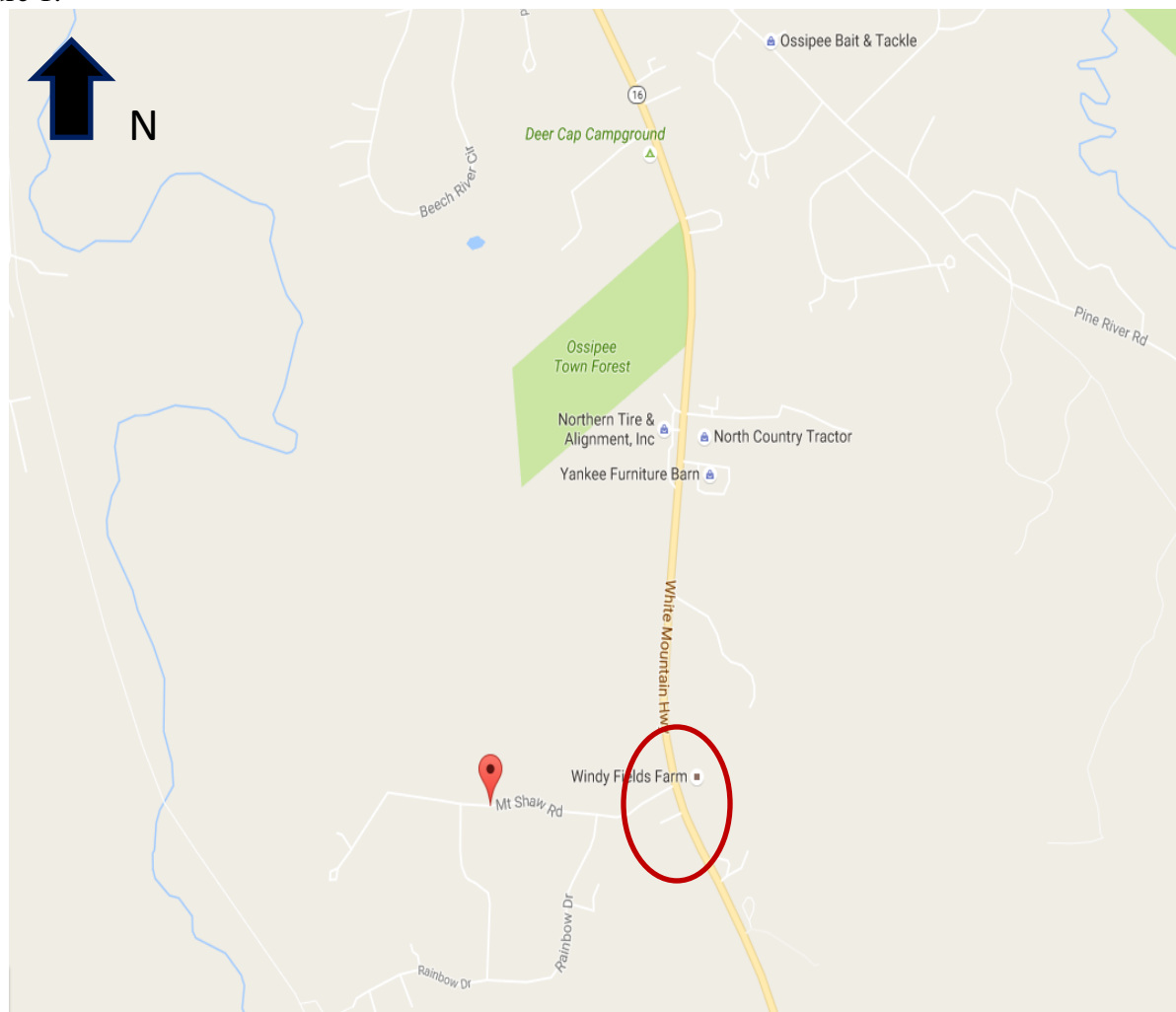


Figure 1: Study Area

The Town of Ossipee and the Lakes Region Planning Commission identified the intersection for the Road Safety Audit field review.

The RSA was conducted by a team comprised of members with expertise in planning, design, operations and safety, as well as nearby property owners. The RSA team consisted of the following members:

Name	Organization	Name	Organization
Brad Harriman	Public Works Director	William Lambert	NHDOT - Traffic
Bill Eldridge	Ossipee Highway Foreman	Alan Hancorn	NHDOT – District 3
James Eldridge	Police Chief	Victoria Chase	NHDOT – Highway Design
Adam Riley	Fire Chief Ossipee Corner	Jonathan Hebert	NHDOT – Highway Design
Michael Brownell	Fire Chief Center Ossipee	Michelle Marshall	NHDOT – Highway Design
Michael Izard	Lakes Region Planning Commission		

The eight-step RSA process detailed in the Federal Highway Administration's (FHWA's) *Roadway Safety Audit Guidelines* (FHWA, 2006) was utilized for conducting this RSA. This included a meeting with

the RSA team and other stakeholders to review existing information and identify concerns, followed by a field review to verify concerns and identify other potential safety issues. Based on the field review and crash analysis, the team has suggested improvements to address the identified safety issues. The suggestions have been categorized as short-term, medium-term, and long-term. Short-term improvements can typically be implemented through local or state maintenance forces, while medium and long-term improvements often require additional planning, design, and funding. Conceptual drawings were developed for three general alternatives, and a benefit-cost analysis was conducted for each alternative. Construction costs were estimated from the NHDOT Weighted Average Unit Prices (NHDOT, 2016) and national averages. Expected benefits were based on crash modification factors (CMFs) obtained from the Highway Safety Manual (AASHTO, 2010), FHWA CMF Clearinghouse ([www.cmfclearinghouse.org](http://www.cmfclearinghouse.org)), and other related resources. Crash costs were based on the NHDOT 2013 Highway Safety Improvement Program Guidelines and FHWA Crash Cost Estimates by Maximum Police-Reported Injury Severity within Selected Crash Geometries (FHWA-HRT-05-051).

The Eight step process includes:

1. Identify project
2. Select RSA team
3. Conduct Road safety audit meeting
4. Conduct field review
5. Conduct analysis & prepare report
6. Present strategies and concepts
7. Prepare formal response
8. Incorporate findings

### **III. Background Information:**

Ossipee was incorporated as a town in 1785 and is located in Carroll County. In 2010 the census has the population at 4,345. The town has several rivers crossing it: Ossipee, Pine, Bearcamp and Lovell. It also has several State Roads crossing the town: 16, 25, 28 and 171. Ossipee is made of many small villages scattered among the Ossipee Mountains. In the late 1800s, trains brought commerce and tourists to the area and Ossipee was considered to be a summer resort. Ossipee has a history of mills and factories to support its economy. The roadway network especially, route 16 continues to bring tourists to town and through the town.

### **IV. Route 16/Mount Shaw Road Intersection**

This intersection is in the middle of the town of Ossipee. NH 16 is a north-south arterial that traverses eastern NH extending from Portsmouth, NH to Wentworth's Location, NH and continues into Maine. There is a single lane of traffic in each direction on Route 16 with the southbound direction also having a passing lane. Mount Shaw road is a dead end street and has several other local roads feeding onto it. This area is only residences. There are 2 businesses on Route 16 near Mount Shaw Road, one adjacent to the street and another across the street that are also generating turning traffic.

### **V. Traffic Data**

The annual average daily traffic (AADT) estimates were obtained from Lakes Region Planning Commission. The AADT on NH 16 in 2014 was 9,787 and in more recent data is 13,000.

The posted speed limit on NH 16 is 50 MPH and on Mount Shaw Road is 30 MPH.

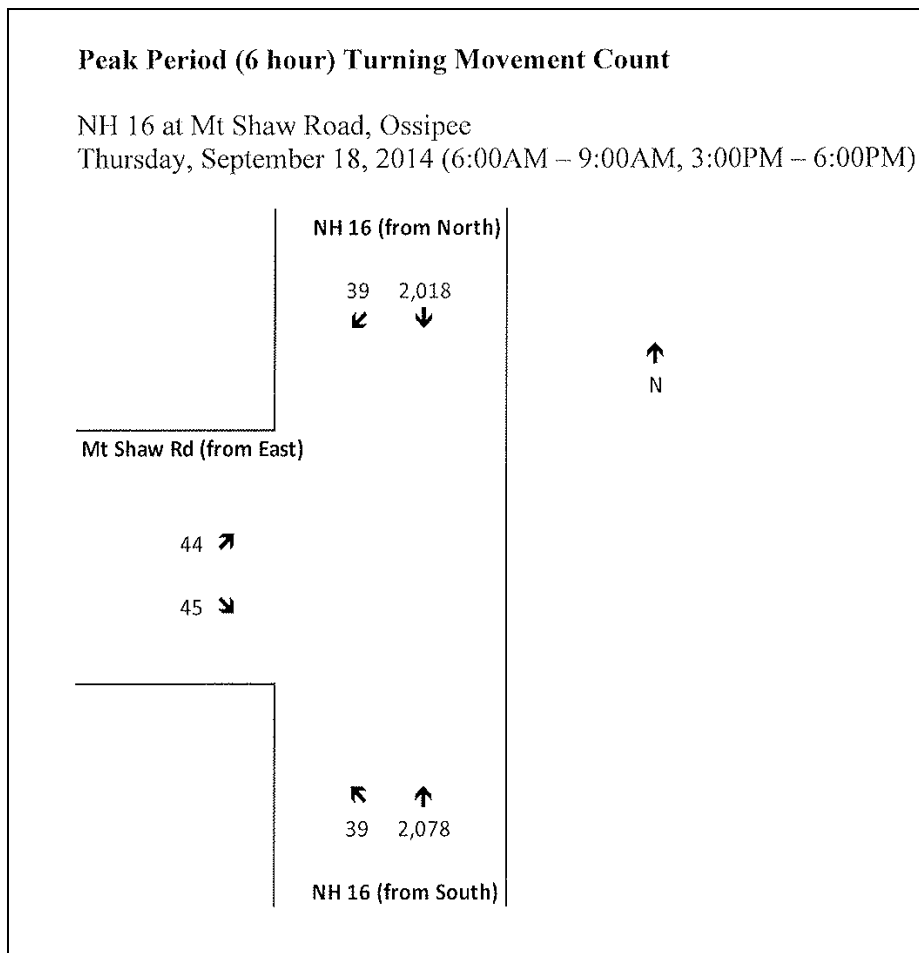
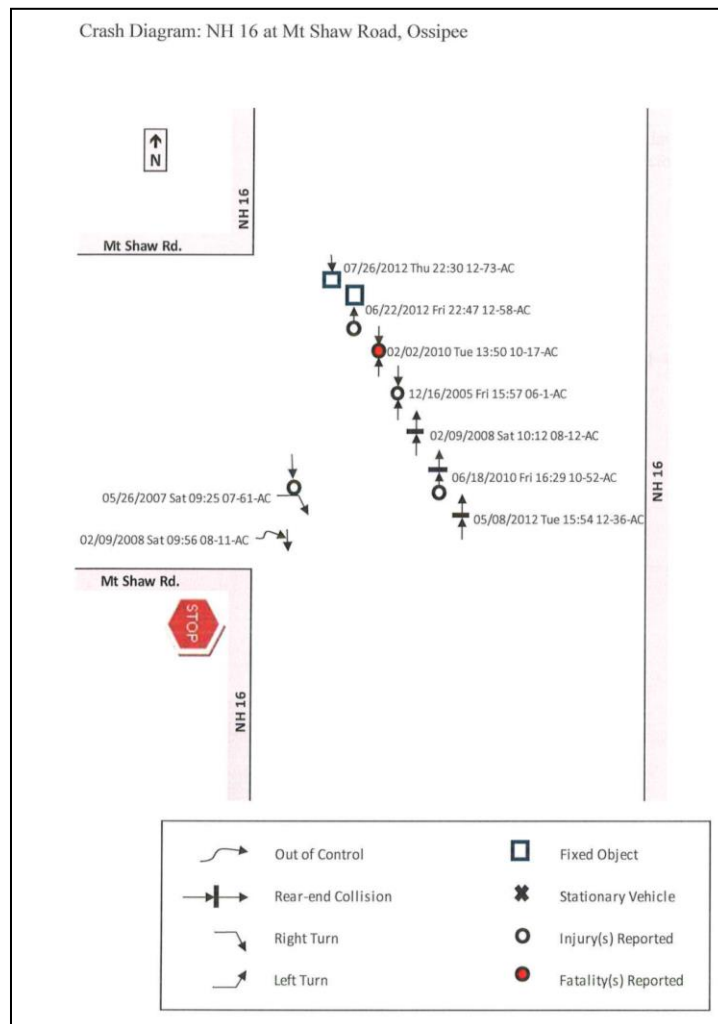


Figure 2: Turning Movements

Lakes Region Planning Commission collected turning counts at the intersection of NH 16 and Mount Shaw Road, shown in Figure 2. The traffic counts show that the AM and PM peak hours for the intersection are from 6:00 to 9:00 am and from 3:00 to 6:00 pm. The counts also indicate that the turns occurring at the intersection are northbound lefts and southbound rights. The principle movements are thru traffic on Route 16 with minor turning counts for the side road.

## VI. Crash Data

The state crash data shows there were numerous crashes in the 10 year period from 2004 through 2014. The crash types include one fatal, one non-incapacitating injury, one possible injury and 36 no apparent injury. The Town of Ossipee's data shows there were a fatality and 4 injury crashes.



TYPICAL CRASHES EXPECTED (per RSA item)	EXPECTED CRASH SEVERITY	SEVERITY RATING
crashes involving high speeds or heavy vehicles, pedestrians, or bicycles	probable fatality or incapacitating injury	<i>Extreme</i>
crashes involving medium to high speed; head-on, crossing, or off-road crashes	moderate to severe injury	<i>High</i>
crashes involving medium to low speeds; left-turn and right-turn crashes	minor to moderate injury	<i>Moderate</i>
crashes involving low to medium speeds; rear-end or sideswipe crashes	property damage only or minor injury	<i>Low</i>

## VII. Stakeholder Identified Risk Factors & Site Observations:

A field visit was conducted during the Road Safety Audit meeting. The weather was warm and sunny. The following are the concerns identified in the group discussion prior to the field review:

- There is a trucking climbing lane heading south on Route 16
- Traffic speeds thru this area of Route 16
- There are lots of cars on Route 16 in this area
- The conflicts are the traffic turning onto and out of Mount Shaw Road
- Businesses across the street and next to Mount Shaw Road have grown with more customers
- Traffic backs up during peak conditions from the Route 16 and Route 28 intersection
- The crest causes a sight distance issue for Northbound Route 16 traffic
- Are there enough warning signs identifying the intersection?
- Could the truck climbing lane be converted to a center two way left turn lane? Route 16 then would have a lane for thru traffic in each direction and a refuge for turning traffic

The Following are the concerns identified by the group in the field at the intersection:

- The group thought brush may need to be cleared along Route 16 south of the Windy Fields Farm driveway. But the group discovered the signs are blocking the sight distance not brush.
- Where should the two way left turn stop and start? Preliminary Design will evaluate the location of the Two Way Left Turn lane with the proposed project Ossipee #10431 but the concept is to start and the end the two way left turn lane in the same location as the trucking lane. The truck climbing lane would be removed. The two way left turn lane should be placed far enough over the crest so it can be seen in both directions on Route 16.
- Preliminary Design should evaluate the pavement width and stripping at station 257+00.
- Is there room northbound on route 16 to provide a widen shoulder before and after the Windy Fields Farm driveway?
- A minimal apron for Mount Shaw Road should be provided in the Ossipee State project #10431.
- The Bureau of Traffic should evaluate if a stop sign and stop bar should be added at the end of Mount Shaw Road.



Looking south at the Northbound traffic of Route 16. Windy fields Farm has signs in the ROW that is blocking sight distance





Looking south along Route 16 across Mount Shaw Road.

**VIII. Assessment Findings and Mitigation Strategies:**

**Short Term Solutions**

<b>NHDOT:</b>	1. District 3 will contact Windy Fields Farm about their signs and brush within the ROW that are blocking sight distance for their driveway.
<b>Town:</b>	2. The Police Department should provide enforcement along Route 16.

**Medium Term Solutions**

<b>NHDOT:</b>	3. Bureau of Traffic will evaluate the signs along Route 16 especially those warning of the intersection.
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**Long Term Solutions**

<b>NHDOT:</b>	4. Provide the two way left turn lane for Mount Shaw Road and include a 5' apron for Mount Shaw Road. Bureau of Traffic will evaluate the pavement markings and signs along Route 16. Any changes will be included the Ossipee State project #10431.
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**Concept #1:**

Provide two-way left turn lane where the existing passing lane is on Route 16 Southbound (approximate stationing 221+00 to 260+00 on the Ossipee #10431 project). Total Cost is \$315,000 for PE and Construction, if a stand- alone project, with a B/C ratio of 10.96.

## **IX. Benefit/Cost Analysis of Improvements:**

A Benefit/Cost (B/C) Analysis was performed to compare the benefits of risk mitigation strategies identified. The estimated benefits will be calculated based on the number of crashes that each mitigation strategy can prevent multiplied by the cost of that crash type. The anticipated cost of constructing each safety project will be estimated through an engineering estimate.

Con- cept	total cost	Benefit Cost Ratio	Net Benefit	Crash Re- duction	Service Life	Description
1	\$315,000	10.96	\$3,138,606	0.03	20 year	Two-way left turn lane

## **X. Audit Response:**

Submission of this report represents completion of Steps 1 through 6 of the RSA process. The Road Safety Audit team has received a copy via email of the draft Road Safety Audit Report. They were able to make comments on the Report.

Once the Report is finalized, the NHDOT will then present the findings and concepts recommended to the Highway Safety Improvement Program Committee (HSIP Committee), the State of NH Department of Transportation Executive Office, and at the Public Hearing for the Ossipee state project #10431. Each of these groups must support the same recommendations for a project to move forward. The Select board will prepare a formal response in the form of a letter identifying which option(s), if any, they support. Each group may:

- Agree with the suggestion described by the audit team;
- Disagree with the suggestion described by the audit team (and provide a valid reason as to why they choose not to adopt the audit team's suggestions);
- Choose not to implement certain improvements at all due to financial constraints or disagreement regarding the safety issue, believing that there is no increased risk associated with the concern raised by the audit team.

Once a project is created, funding sources will be identified and obligated, and preliminary design will begin. It is important to understand that the RSA recommendations will not be implemented unless all of the above mentioned bodies concur.

## Appendix A – B/C Analysis

Concept	BCR	NB	ARKA	Service Life	Description
1	10.96	\$3,138,606	0.03	20 year	Two Way Left Turn lane

Note these numbers assume the concept is in its own stand- alone project.

## Appendix B – Summary of strategies

### Ossipee Route 16/ Mount Shaw Road Status Summary

#	Suggested Strategy	Responsible Stake holder	Solutions:	Comments	Date Completed
1	Provide the two way left turn lane. The truck climbing lane would be removed. The two way left turn lane should be placed far enough over the crest so it can be seen in both directions on Route 16.	NHDOT			
2	Is there room northbound on route 16 to provide a widen shoulder before and after the Windy Fields Farm driveway?	NHDOT	This will not be part of the 10 Year plan project		
3	A minimal apron for Mount Shaw Road should be provided in the Ossipee State project #10431.	NHDOT			
4	The Bureau of Traffic should evaluate if a stop sign and stop bar should be added at the end of Mount Shaw Road	NHDOT Bureau of Traffic			
5	Enforce speed limits	Police Department & State police			
6					